

CLAIMS

1. A power supply device including a main circuit which converts an inputted alternating current or direct current into another direct current,
5 and a control circuit which controls the main circuit, the power supply device comprising:

a Schottky barrier diode, which is placed as a temperature detection element at a region where a temperature is measured, to which a reverse voltage is applied, and through which a reverse leakage current flows;

10 detecting means for detecting the reverse leakage current flowing through the Schottky barrier diode; and

a control element which stops an operation of the control circuit when an output of the detecting means becomes equal to or more than a predetermined value.

15 2. The power supply device according to claim 1,

wherein the detecting means comprises:

a light-emitting element connected to a direct current output terminal of the main circuit;

20 a light-receiving element which flows a current in response to light emission of the light-emitting element; and

current controlling means for flowing a current through the light-emitting element when a voltage corresponding to the reverse leakage current flowing through the Schottky barrier diode becomes equal to or
25 more than a reference voltage, the current controlling means being connected between the Schottky barrier diode and the light-emitting element,

wherein the control element stops the operation of the control circuit based on the current flowing through the light-receiving element.

30 3. The power supply device according to claim 2,

wherein the current controlling means comprises:

a resistor connected in series to the Schottky barrier diode; and

a comparator which sets a potential of an output terminal thereof to
a low level when a voltage which occurs in the resistor by the reverse
5 leakage current flowing through the Schottky barrier diode becomes equal
to or more than the reference voltage,

wherein the light-emitting element is connected between a positive
electrode end of the direct current output terminals and an output terminal
of the comparator, and has a current of a predetermined value or more
10 flowing therethrough to emit light when output potential of the comparator
is set to the low level.

4. The power supply device according to claim 3, comprising a zener diode
connected between the output terminal of the comparator and a negative
15 electrode end of the direct current output terminals,

wherein the zener diode flows the current through the light-emitting
element when a voltage between the direct current output terminals
becomes larger than a predetermined breakdown voltage.

20 5. The power supply device according to claim 2,

wherein the current controlling means comprises:

a resistor connected in series to the Schottky barrier diode; and

a transistor which is turned on when a voltage which occurs in the
resistor by the reverse leakage current flowing through the Schottky barrier
25 diode becomes equal to or more than the reference voltage,

wherein the light-emitting element is connected between a positive
electrode end of the direct current output terminals and the transistor, and
has a current of a predetermined value or more flowing therethrough to
emit light when the transistor is turned on.

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6. The power supply device according to claim 5, comprising a zener diode

connected between the light-emitting element and a negative electrode end of the direct current output terminals,

wherein the zener diode flows the current through the light-emitting element when a voltage between the direct current output terminals becomes larger than a predetermined breakdown voltage.

7. The power supply device according to claim 2,

wherein the current controlling means comprises a resistor connected in series to the Schottky barrier diode,

wherein the light-emitting element is connected to both ends of the resistor, and has a current of a predetermined value or more flowing therethrough to emit light when a voltage which occurs in the resistor by the reverse leakage current flowing through the Schottky barrier diode becomes equal to or more than a forward threshold voltage.

8. The power supply device according to claim 2,

wherein the current controlling means comprises:

a resistor connected in series to the Schottky barrier diode; and

a diode in which an anode is connected to a connecting point of the Schottky barrier diode and one end of the resistor,

wherein the light-emitting element is connected between a cathode of the diode and the other end of the resistor, and has a current of a predetermined value or more flowing therethrough to emit light when a voltage which occurs in the resistor by the reverse leakage current flowing through the Schottky barrier diode becomes equal to or more than a sum of a forward threshold voltage of the diode and a forward threshold voltage of the light-emitting element.

9. The power supply device according to any one of claims 7 and 8 comprising a zener diode connected between a positive electrode end of the direct current output terminals and the light-emitting element,

wherein the zener diode flows the current through the light-emitting element when a voltage between the direct current output terminals becomes larger than a predetermined breakdown voltage.

5 10. The power supply device according to claim 1, comprising a rectifying diode connected to a passage of a main current in the main circuit,

wherein the Schottky barrier diode and the rectifying diode are thermally coupled to each other and mechanically integrated with each other.

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11. The power supply device according to claim 1, comprising a current detection resistor connected to a passage of a main current in the main circuit,

15 wherein the Schottky barrier diode and the current detection resistor are thermally coupled to each other and mechanically integrated with each other.